

A REDESCRIPTION OF *SPELEORODENS MICHIGENSIS*
(FORD) N. COMB. (ACARI: EREYNETIDAE), A NASAL MITE
OF MICROTINE RODENTS, WITH COMMENTS ON GENERIC
RELATIONSHIPS IN THE SPELEOGNATHINAE

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Abstract.—*Speleognathopsis michigensis* Ford is redescribed and placed in the genus *Speleorodens*. *Speleorodens clethrionomys* Fain and Lukoschus is placed in synonymy with *S. michigensis*. The characters used in delimiting genus group taxa within the Speleognathinae are discussed and the taxonomic system of Domrow is rejected in favor of that of Fain. A new genus, *Domrownetes*, is created for *Paraspeleognathopsis exul* Domrow.

Mites of the family Ereynetidae, subfamily Speleognathinae, are cosmopolitan endoparasites of the upper respiratory passages of birds and mammals. In the latest reviews of the speleognathine parasites of mammals (Fain, 1970b; Fain & Lukoschus, 1971), 22 species in 7 genera were reorganized. Of these species, only 2 were reported from the Neartetic region: *Speleorodens strandtmanni* (Fain, 1955) (= *Paraspeleognathopsis sciuri* Clark, 1961) from the Eastern gray squirrel, *Sciurus carolinensis*, and *Neospeleognathopsis bastini* (Fain, 1958) from the big brown bat, *Eptesicus fuscus*. Domrow (1975) described a new species, *Paraspeleognathopsis exul*, from Australia and synonymized *Speleorodens* Fain, 1962, and *Speleomys* Fain, 1970, with *Paraspeleognathopsis* Fain, 1958. He also pointed out several omissions in the review by Fain (1970b), notably the lack of reference to *Speleognathopsis michigensis* Ford, 1962, a parasite of the meadow vole, *Microtus pennsylvanicus*, in North America, and to the records by Drummond and Medley (1964) of *Speleognathus australis* Womersley, 1936, from North American bison, *Bison bison*.

During my recent examinations of microtine rodents for acarine parasites, a single female of a speleognathine mite was collected from the nasal passages of a red-backed vole, *Clethrionomys gapperi*, collected at Arnot Forest, Schuyler County, New York, USA. In the key to species presented by Fain (1970b), this specimen keys to *Speleorodens clethrionomys* Fain and Lukosehus, 1968. However, comparison with the original description of *Speleognathopsis michigensis* showed no significant differences that would separate these two nominal taxa. I examined the holotype of *S. michigensis* in order to redescribe the female of this species and to note individual variations among the specimens at hand and those described in the literature. In the following description, all measurements

are in micrometers. Classification of setal types is based upon Fain (1963) and nomenclature for idiosomal setae follows that of Fain (1970a).

Family EREYNETIDAE Oudemans 1931

Subfamily SPELEOGNATHINAE Womersley 1936

Genus *Speleorodens* Fain 1962

Speleorodens michigensis (Ford, 1962) NEW COMBINATION

Speleognathopsis michigensis Ford 1962:104.

Paraspeleognathopsis (Speleorodens) clethrionomys Fain and Lukoschus 1968:86 NEW SYNONYMY.

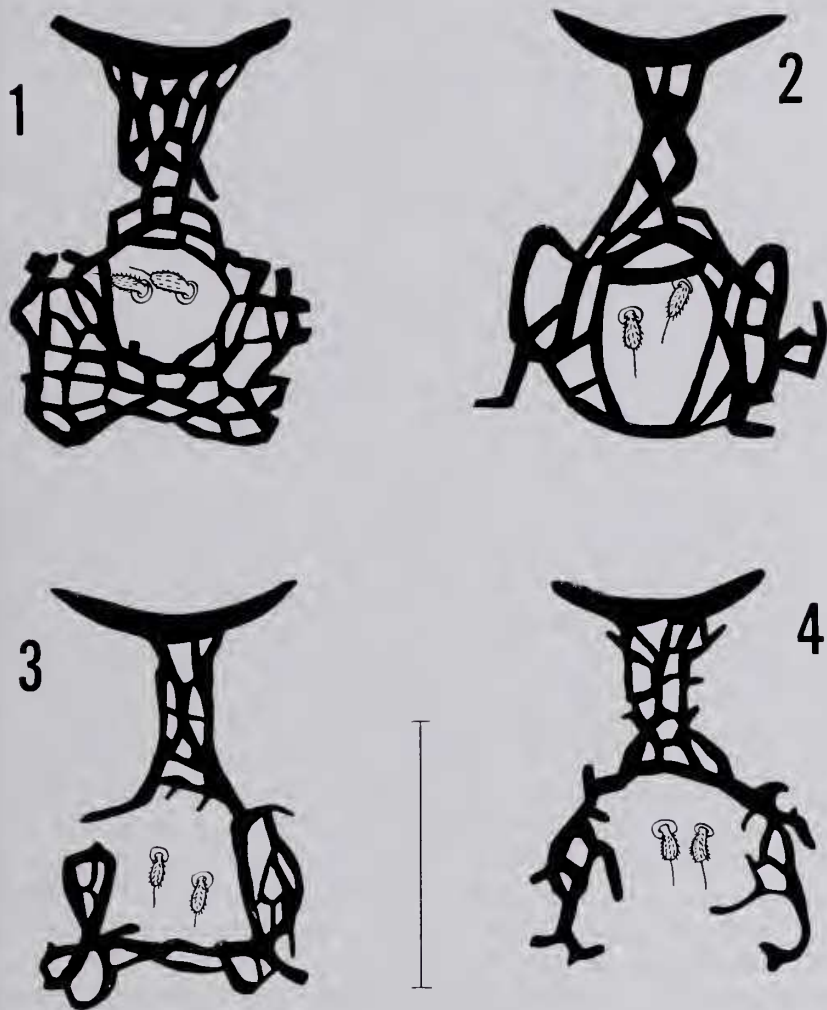
Speleorodens clethrionomys Fain 1970a:516, 519.

Paraspeleognathopsis michigensis Domrow 1975:98.

Female.—Length of idiosoma 264–350; width 150–255. Body cuticle finely striate with minute projections along striations. Cuticle completely hydrophobic. Network of subsurface sclerotizations well developed in the legs, coxal areas, gnathosoma and dorsal shield area. Dorsal shield composed of a network of wide lines interconnecting to form large open cells between them (Figs. 1–4). These cells larger and more irregular in shape than those of *S. strandmanni*. Posterior margin of shield either open or closed by a few transverse lines. Interior portion of shield area containing setae *vi* without subsurface lines. Length of shield 90. Most dorsal setae cylindrical, rounded terminally, covered with short barbs and bearing an elongate terminal flagellum (Type BN). Length with flagellum 12–18; length of basal body of seta 6–8. Exceptions are setae *ve* which are shorter (4) and bear no flagellum (Type B), and setae *sci* (sensillae) which are elongate (22–28) and barbed along their entire length. Setae of the ventral idiosoma of the same form as dorsal setae but shorter, length 4–6 excluding flagellum which is difficult to observe. Genital opening in the form of an inverted Y, flanked by 3 pairs of setae (2 pairs *ge*; 1 pair *gm*). Anus small, indistinct, flanked by 1 pair of setae (*ai*). Setae *ae* displaced terminally or dorsally. Three pairs of intercoxal setae (*ic* 1–3) positioned mid-ventrally in a line between coxal areas.

Gnathosoma.—Hypostomal area with two pairs of short, barbed ventral setae. Palps consisting of two distinct segments; proximal segment bears a single modified seta (Type Fa); distal segment rounded, bearing 4 setae similar to body setae but very short (Type BN) and a single solenidion. Chelicerae reduced, details difficult to observe.

Legs.—Legs with pattern of lines well developed. Ereynetal organ of tibia I consisting of a basal bulb connecting to the surface via a long duct, in lateral view entire organ has the appearance of the letter J. Chaetotaxy: coxae 2-1-1-1; trochanters 1-1-0-0; femora 5(4)-5(4)-3-1; genua



Figs. 1-4. Variation in dorsal shield in *Speleorodens michigensis*. 1. Holotype from *Microtus pennsylvanicus*; 2. Specimen from *Clethrionomys gapperi*; 3 and 4. Specimens from *C. glareolus*. (Figures 3 and 4 redrawn from Fain and Lukoschus (1968).) Scale line is 50 micrometers.

4(5)-4-3-2(3); tibiae 4-2-2-2; tarsi 12-8-7-7. Certain leg setae greatly expanded, especially on femora, genua and tibiae (3 each); other setae similar to body setae or more elongate, especially on tarsi. A single solenidion is present on tarsi I and II. Two well developed claws present on each pretarsus. Accessory pulvillar pads absent.

Male.—Male specimens were not available for study. The male was described (as *P. (S.) clethrionomys*) by Fain and Lukoschus (1968), and differs from the female in the shape of the leg setae which are not expanded.

Nymphs.—Nymphal instars are unknown for this species.

Larva.—Larvae were not available for study, however, they were described both by Ford (1962) and by Fain and Lukoschus (1968). The larva of this species is characterized by a single claw which is angled at 90 degrees present on pretarsus III.

Hosts and localities.—*Speleorodens michigensis* has been reported from the following hosts, all rodents of the family Cricetidae, subfamily Microtinae: *Microtus pennsylvanicus* (Ord), Ingham County, Michigan, USA (Ford, 1962); *Microtus agrestis* (Linnaeus), Nijmegen, Holland (Fain and Lukoschus, 1968); *Clethrionomys glareolus* (Schreber), Holland (various localities) (Fain and Lukoschus, 1968); *Clethrionomys gapperi* (Vigors), Schuyler County, New York, USA (present study).

Intraspecific variation in S. michigensis.—Several characters of systematic importance are variable within this species, as indicated by examination of specimens and published descriptions from different hosts. However, the variations are not consistent with host differences and probably only reflect the inherently large genetic variability within the species. Such variability has been noted previously for the Ereyetidae (Fain, 1963) and for other endoparasitic groups of mites (Johnston and Manischewitz, 1973). The specific variations I have noted involve the shape of the dorsal shield, the position of seta l_1 and the leg chaetotaxy. In the holotype specimen of *S. michigensis* from *M. pennsylvanicus*, the open area containing the *vi* setae in the center of the dorsal shield is closed posteriorly by 3 lines (Fig. 1). In the specimen from *C. gapperi*, the area is closed by a single line (Fig. 2). In two specimens from *C. glareolus*, Fain and Lukoschus (1968) illustrate this area being closed by 2 lines in one specimen (Fig. 3) and completely open in another (Fig. 4).

In the holotype of *S. michigensis*, both setae l_1 are situated well posterior to a line drawn through the bases of setae d_1 . In the specimen illustrated by Fain and Lukoschus (1968) and in the schematic drawing of *S. clethrionomys* by Fain (1970a), the l_1 setae are slightly anterior to the d_1 . In the specimen from *C. gapperi*, on the other hand, one seta of this pair is clearly posterior to the d_1 while the other is slightly anterior.

The leg chaetotaxy of *S. michigensis* was not discussed in the original description by Ford (1962). Fain and Lukoschus (1968) noted the following variations within a series of specimens from *C. glareolus* and *M. agrestis*: coxa I, 2 or 1 seta; femur I, 4 or 5; genu I, 4 or 5; and genu IV, 2 or 3. The holotype of *S. michigensis* and the specimen from *C. gapperi* show identical leg chaetotaxy and show the following character states: coxa I, 2 setae;

femur I, 5 setae (3 inflated and 1 uninflated distal setae and 1 small uninflated proximal seta); femur II, 5 setae in the same pattern as on femur I except the inflated setae are not nearly as large; genu I, 4; and genu IV, 2.

Discussion

Fain (1970b) recognized 9 genus-group taxa within the mammal-associated Speleognathinae. Domrow (1975), on the other hand, recognized only 3: *Speleognathus*, 1 species from Artiodactyla (Bovidae); *Paraspeleognathopsis* (including *Speleomys* and *Speleorodens*), 11 species from 3 orders of small mammals; and *Neospeleognathopsis* (including *Speleomyotis*, *Speleochir*, *Neospeleochir*, and *Hipposideroptes*), 8 species from Chiroptera. The characters which have been used to delimit these taxa are the presence or absence of cycles, the form of the idiosomal and leg setae, the degree of reduction of palpal segmentation and the structure of the pretarsus.

Based upon the relative values placed upon these morphological characteristics in the taxa involved, I find the system of Fain (1970b) preferable to that of Domrow (1975). The validity of these characters in defining taxa of various ranks is established in other prostigmatid taxa and in unrelated but ecologically similar endoparasitic groups. The characters are not as Domrow (1975) stated merely "an arbitrary selection from the range of characters useful as species-group level." (His emphases.) Furthermore, species subsequently described from bats (Fain and Lukoschus, 1971) but not mentioned by Domrow (1975) are easily accommodated within the more limited generic-level groups of Fain and do not show intermediate characteristics. In fact, the characters used by Fain in delimiting taxa at the subgeneric level in one group (bat parasites) appear to be valid at the generic level when applied to other groups (rodent parasites). It is probable that all the genus-group taxa of Fain represent valid genera which will in time be shown to be diverse. In this regard, I recognize the following genera among the bat-associated speleognathines: *Hipposideroptes*, *Neospeleognathopsis*, *Speleochir*, *Speleomyotis* and *Neospeleochir*, the latter two having been regarded as subgenera by Fain (1970b). On the other hand, the three groups recognized by Domrow (1975) at the generic level probably represent monophyletic evolutionary lines.

Finally, of all the described species, only *Paraspeleognathopsis exul* Domrow, 1975, from the Australian marsupial *Antechinus stuartii*, requires revision in systematic placement in order to be accommodated in the system of Fain (1970b). I consider this species to be the most primitive known species among the group parasitizing small terrestrial mammals (*Paraspeleognathopsis* s.l. of Domrow). It displays the most plesiomorphic character states, namely, 3-segmented palpi, least reduced leg chaetotaxy (except genu IV) and least reduction of genital setae. Apomorphic char-

acter states such as the loss of 1 pair of hypostomal setae, loss of 1 or 2 setae on genu IV and elongation of the dorsal shield as in the bat-associated genera indicate the distant relationship of this species to others. Within the taxonomic system of Fain, this combination of characters requires the erection of the following new genus.

Domrownetes NEW GENUS

Speleognathine mites with 3 free palpal segments; 1 pair of hypostomal setae; 12 setae present on tarsus I, 5 pairs of genital setae. Dorsal shield elongate with few open cells. Idiosomal and leg setae barbed (Type B) without terminal flagellum. Pretarsi without accessory pulvillar pads.

Type species: *Paraspeleognathopsis exul* Domrow 1975 by monotypy.

Derivation: This genus is named for Dr. Robert Domrow in recognition of his contributions to the knowledge of respiratory parasites of vertebrates. The name is formed by contracting the name Domrow with *Ereynetes*, the most primitive genus in the family, and is masculine in gender.

The following key to the speleognathine genera associated with mammals is modified from that of Fain (1970b). Keys to mammal-associated species are given in Fain (1970b) and Fain and Lukoschus (1971).

Key to Genera of Speleognathinae Associated with Mammals

- | | |
|---|---|
| 1. Idiosomal and leg setae barbed (Type B) | 2 |
| – Some idiosomal or leg setae striate (Type S) or simple | 5 |
| 2. Palp with 3 free segments; 1 pair of hypostomal setae | 3 |
| – Palp with 1 or 2 free segments; 2 pairs of hypostomal setae; associates of Rodentia and Primates | 4 |
| 3. Tarsus I with 12 setae; 5 pairs of genital setae; dorsal shield elongate with few small cells; associates of Marsupialia | |
| <i>Domrownetes</i> n. gen. | |
| – Tarsus I with 10 setae; 3 pairs of genital setae; dorsal shield expanded posteriorly with many larger cells; associates of Rodentia | |
| <i>Speleomys</i> Fain, 1970 | |
| 4. Palp with 1 free segment; dorsal shield without open central area bearing setae <i>vi</i> | 6 |
| <i>Paraspeleognathopsis</i> Fain, 1958 | |
| – Palp with 2 free segments; dorsal shield with setae <i>vi</i> situated in open central area | 7 |
| <i>Speleorodens</i> Fain, 1962 | |
| 5. Eyes present; associates of Artiodactyla | |
| <i>Speleognathus</i> Womersley, 1936 | |
| – Eyes absent; associates of Chiroptera | 6 |
| 6. Pretarsi with accessory pulvillar pads | 7 |
| – Pretarsi without accessory pulvillar pads | |
| <i>Hipposideroptes</i> Fain, 1970 | |
| 7. Accessory pulvillar pads small, median; setae <i>vi</i> present | 8 |

- Accessory pulvillar pads large, striate, laterally positioned; setae *vi* absent 9
- 8. Palp with 3 free segments; 2 pairs of hypostomal setae; setae *l*₅ present; 7 pairs of genital setae *Speleomyotis* Fain, 1962
- Palp with 2 free segments; 1 pair of hypostomal setae; setae *l*₅ absent; 3-5 pairs of genital setae *Neospeleognathopsis* Fain, 1958
- 9. Palp with 2 free segments; sensillae not expanded *Speleochir* Fain, 1966
- Palp with 1 free segment; sensillae expanded *Neospeleochir* Fain, 1970

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